to justify the description of the revelation of the secret of synthetic indigo by reference to an accident which occurred in the investigation of the processes for the manufacture of phthalic acid and certainly greatly facilitated the production of this substance—an intermediate in the manufacture of artificial indigo. So, if the initiated emphasise the unessential, why should we blame the layman and be surprised that well-ordered and planned design should appear to be but the workings of chance, for every such achievement is a witness to the conquest of well-founded theoretical speculation?

But I do not wish to conclude on a despondent note, nor is it right that I should do so in view of the many activities operating for the promotion of scientific research, and of such evidence as that supplied by the magnificent endowment of the chemical department of the University of Cambridge, all of which are evidences of what we may reasonably hope to be a happy augury for the future of chemistry and chemists in this country.

NOTES.

THE James Watt centenary celebrations in Birmingham were opened with lectures by Prof. F. W. Burstall and Prof. Hele-Shaw on Tuesday morning (September 16). In the afternoon there was a memorial service at Handsworth Parish Church, in which Watt, Boulton, and Murdoch were buried, an address being delivered by Canon E. W. Barnes, Master of the Temple. This was followed by a garden-party at Heathfield Hall, and a reception by the Lord Mayor at the Council House. On Wednesday morning, as we go to press, lectures are to be given by Sir Oliver Lodge, Prof. Alex. Barr, and Prof. J. D. Cormack, and in the afternoon visits will be made to some of Watt's engines. In the evening will be held the centenary dinner. On Thursday the University will hold a special Degree Congregation to confer honorary degrees on the American Ambassador (the Hon. J. W. Davies), Sir Charles Parsons, Vice-Admiral Goodwin, M. Rateau (of Paris), Sir George Beilby, Col. Blackett, Prof. Barr, and Mr. F. W. Lanchester. The response to the appeal for the memorial fund has up to the present been very meagre, and unless large additions are made to the subscription list the realisation of even one of the objects of the fund will not be possible. It is to be hoped that a marked improvement may be made during the week.

SUMMER time is to end this year at 2 a.m. on September 29. Each year the terminal dates of summer time have varied, and, though the dates will, of course, be known to our future compilers of natural phenomena, the use of summer time can scarcely fail to result in some errors. Even so simple a change as that of the Gregorian calendar has been attended by mistakes. Some years ago, for instance, the late Sir Edward Fry referred to some entries on British earthquakes in the diary of John Wesley (NATURE, vol. lxxix., 1898, p. 98). He remarked that the London earthquakes of February 8 and March 8, 1750, which Wesley describes, are not mentioned in Mallet's Catalogue. Wesley's dates are correctly given, for the Gregorian calendar came into force after September 2, 1752. Mallet, however, gives the days in new style as February 19 and March 19. The error in this case is easy to detect; but, unless the letters "G.M.T." or the words "summer time" are added, it may be difficult to decide whether records of an earthquake at, say, 2.12 and 3.8 relate to the same shock at about 2.10 G.M.T. or to different shocks.

WE regret to learn from Dr. G. C. Simpson, Director-General of Observatories, Simla, that Mr. W. L. Dallas, who was Scientific Assistant to the Meteorological Reporter to the Government of India from 1882 to 1906, passed away at Simla on August 5. Mr. Dallas's original meteorological work was devoted almost entirely to a study of the weather conditions over the Indian seas, although he published a few papers on more general subjects. He discussed for the Government of India the marine observations of the Indian seas collected by the London Meteorological Office during twenty years—1856–75. He also investigated the nature and causes of storms in the Arabian Sea, using all records available for the period 1648–1889, on which inquiry all later work undertaken by the India Meteorological Department for warning ships approaching India from the west was based. Mr. Dallas fittingly closed his long official connection with the India Meteorological Department by the compilation of a meteorological atlas of the Indian seas, which will be found in use on most ships visiting the East.

MR. EDWIN O. SACHS, whose death we announced last week, will be remembered mainly by his keen interest and untiring activity in relation to all questions regarding fire protection and fire prevention. The terrible holocaust of the Paris Charity Bazaar fire in 1887 led Mr. Sachs to form the British Fire Prevention Committee, of which he was the chairman and guiding spirit up to the time of his death. In his work with the committee Mr. Sachs was supported by a number of public men and professional friends. Thanks to his energy and devotion and his able leadership, the committee's work, from very small beginnings, soon covered a vast field of activity, which widened from time to time until the foundations of a comprehensive organisation were firmly laid. The large number of tests undertaken by the committee were made in a specially constructed testing station which Mr. Sachs designed, and to which he not only gave unstinted and devoted labour, but also largely financed. This testing station, which has been enlarged and improved from time to time, was the first of its kind, and has served as a model for similar centres of investigation throughout the world. The numerous activities of the committee—which during the war were greatly increased, and included arrangements for a voluntary fire survey force for more than two thousand war hospitals, camps, and factories, also research work of the highest importance to the nation—were initiated and guided by Mr. Sachs's unceasing energies, even during his latter years. All this work on the committee, as well as his other public activities, were rendered entirely voluntarily, and in all he did he was inspired by the highest ideals.

DURING the evening of September 11 an earthquake shock, causing considerable damage, was felt in the region of Monte Amiata, near Siena. At San Casciano several houses were wrecked. A slighter earthquake was also felt on September 12 at Ebingen (Würtemberg).

THE *Times* correspondent at New York reports that on September 13 Mr. Roland Rohlfs, a testing pilot with the Curtiss Aeroplane Corporation, rose from Roosevelt Field, Long Island, to a height of 34,200 ft. This "record" is not officially confirmed, but Mr. Rohlfs will try on the first favourable day to make an authenticated attempt to exceed the altitude believed to have been reached by him.

ON May 20 the volcano Kloet, in Java, discharged suddenly a great quantity of hot mud, which, spreading out in three streams, destroyed the town of Blitar and about thirty villages, and caused the death of several thousand persons. The place was visited by an exploring party two days later, and an interesting two-page reproduction of one of the photographs of the mud-stream is given in the *Illustrated London News* for September 13 (pp. 396–97).

AT a joint meeting of the Royal Asiatic Society, Société Asiatique, American Oriental Society, and Scuola Orientale of the University of Rome, recently held in London, Prof. A. T. Clay, of Yale University, described the efforts of American scholars to free themselves from dependence on Germany for research work in Asia. Several young Assyriologists in America are now devoting themselves to research work. Yale University has taken over the work of Sir W. Ramsay at Antioch, and the American School of Oriental Research in Palestine, which was closed on account of the war, is now to be re-opened on a more extensive scale. At least one professor and several students will be sent annually from Yale to direct operations, which will be carried out in co-operation with the British School, which will be founded on a more important basis.

STUDENTS of the mygalomorph spiders will do well to consult a critical systematic paper on South African species by John Hewitt in the *Annals of the Transvaal Museum* (vol. vi., pt. 3).

SOME results of a collecting expedition to Korinchi Peak, Sumatra, are published in the Journal of the Federated Malay States Museums (vol. vii., pt. 3, 1919). Descriptions, with excellent figures, of a number of Diptera, by F. W. Edwards, of the British Museum, are especially noteworthy.

WE have received the seventeenth Report of the State Entomologist of Minnesota. In addition to articles of economic interest, it contains several papers of systematic value, such as O. W. Oestlund's contribution to the classification of aphids and F. L. Washburn's summary of the Hymenoptera of the State. The illustrations in this Report are exceptionally praiseworthy.

DRS. S. HADWEN and A. E. Cameron, working for the Canadian Department of Agriculture, have made a definite contribution to our knowledge of horse bot-flies (Bull. Entom. Research, vol. ix., pt. 2) by their observations on the eggs and early larvæ of *Gastrophilus haemorrhoidalis* and *G. nasalis* as compared with *G. intestinalis (equinus)*. The first-named species has stalked eggs which are laid on the hairs of horse's lips, while the second lays on the hairs of the intermaxillary space. It is possible that the newly-hatched larvæ may penetrate the horse's skin in these regions, as they were found to bore into the mucous lining of the mouth and also into the tongue of a recently killed calf.

THE possibilities of the manufacture of paper-pulp in Australia is the subject of a Bulletin (No. 11) issued by the Advisory Council of Science and Industry of the Commonwealth of Australia. The bulletin describes the results of some preliminary investigations of the native sources of wood-pulp and pulp from fibre-plants. The most satisfactory results have been obtained with karri and other species of eucalypts, and it is suggested that a thorough survey of the resources might indicate the possibility of building up a wood-pulp industry in Australia. As regards the fibre-plants, a number were found on testing to be unsuitable for paper-making. It is unlikely that either of the grasses Lalang or Marram, which have been used for pulping purposes, could be employed profitably in Australia, and negative results have also been obtained with prickly pear. A blend of 20 per cent. of a sedge (*Gahnia decomposita*) and 80 per cent. karri-pulp is reported as very satisfactory. The conclusion is that if Australia's demands for paper are to be supplied from native sources, the principal material to be used for some years to come must be straw, of which large quantities are produced within a hundred miles radius of Adelaide.

VARIOUS memoranda and letters on "The Reconstruction of Elementary Botanical Teaching," which appeared in the *New Phytologist* during 1917–18–19, have been brought together in pamphlet form. As indicated by the letters, the teaching refers almost exclusively to the elementary university course, and the participants in the discussion are, with few exceptions, engaged in teaching of a university standard. The discussion originated from a memorandum by five botanists who pleaded for a more important place for plant physiology as compared with morphology in the elementary course. This was regarded by some eminent morphologists as a challenge, to which they replied with some vigour. The discussion brings out the fact that botany is a wide subject, attracting students of widely differing temperaments, and there is real difficulty in planning an elementary course which shall form an adequate introduction to the different branches in one or more of which the student may subsequently specialise. As regards the *motif* of the elementary course, it is important that the plant should be studied as a living organism and as part of a larger organisation which is closely associated with its environment. But present-day plant-life is not merely the expression of present-day environment, but largely the outcome of past history; and the neglect of the study of history may be disastrous. There is a considerable amount of elementary botanical teaching outside the universities, and the point of view and methods suitable for the university student are not necessarily those suited to boys and girls at school.

ALTHOUGH the statement is made quite definitely in many text-books that formic acid occurs in the stinging hairs of the common nettle (*Urtica dioica*), the proof has not hitherto been very satisfactory. In early experiments the nettles were cut up, distilled with water, and reactions of formic acid obtained on testing the distillate. Later observers, however, have found that various parts of plants yield formic acid when tested in a similar manner. Hence it was not certain that the acid in the earlier experiments had come from the stinging hairs; it might have been derived from the general plant tissues. Moreover, one of the chief chemical reactions of formic acid, namely, its power of reducing salts of silver and mercury, is not necessarily a conclusive proof of the presence of the acid under the particular conditions of these earlier experiments, since other "reducing" substances might also have been present. The question, however, appears to have now been definitely settled through some ingenious experiments devised by Dr. Leonard Dobbin (Proceedings of the Royal Society of Edinburgh, vol. xxxix., ii., No. 11). By pressing the leaves of growing nettles between dry filter-paper impregnated with barium carbonate, the contents of many thousands of hairs were absorbed without contamination by juices from any other part of the plant. After appropriate treatment the product yielded barium and lead salts, which were crystallised on glass slides, and the two formates identified under the microscope. Whether or not formic acid is the main cause of the intense irritation produced by nettlestings is a further question; the active irritant has been regarded by one investigator as being probably not formic acid, but an enzyme.

THE cause of the colours of "Blue John" and other varieties of fluorite has long been a matter of doubt and controversy. During the last two years Messrs. B. Blount and J. H. Sequeira have carried out an interesting investigation of the problem, and their results are now briefly described in the Transactions of the Chemical Society (vol. cxv., p. 705, 1919). They have carefully analysed blue and white varieties of the mineral, tested the powdered material by extraction with organic solvents, examined the gases occluded by "Blue John," and subjected several types of fluorite to "raying" by exposure to radium and X-rays. They conclude from their experiments that there is no substantial difference between white fluorite and the blue, green, and amethystine varieties, except in the presence of a small amount of organic matter to which the colours are ascribed. The state of dispersion of the organic matter is not discussed. It is already ascertained that the blue colour of certain varieties of rock-salt is due to a colloidal dispersion of sodium in sodium chloride, and the blue colours of sodalite and ultramarine are almost certainly due to a similar cause. To correlate the colours of fluorite with the presence of different amounts of organic matter therefore still leaves the core of the problem unsettled; and it is to be hoped that the authors will continue their work by applying methods of X-ray analysis and ultra-microscopy in the hope of demonstrating the degree of dispersion of the organic matter, molecular or colloidal, in each of the varieties of fluorite on which their present work has been conducted.

THE Union of Technical Men (*Bund technischer Berufsstände*), which has recently changed its name to the Imperial League for German Technology (*Reichsbund deutscher Technik*) is now publishing a regular weekly periodical, which reflects the opinions of the leaders of technical thought in the country. Questions affecting, in particular, the work of reconstruction find an important place in the journal. It is interesting to note that already more than one great conference or Technical Parliament has been held, and energetic measures are being taken with a view to ensure the adequate representation of scientific and technical thought on all public bodies. An announcement in the publications of the League states that a daily paper (*Die Arbeit*) will make its appearance as soon as the difficulties connected with the release of paper supplies are overcome.

WE have received recently a copy of *The Chemical Technology*, a monthly journal devoted to chemistry and chemical technology, published in Tokyo. It is printed chiefly in the Japanese language, but contains a section of about eight pages in English. This consists mainly of commercial notes upon chemical products, such as dyestuffs, alkaloids, wax, menthol, and peppermint oil. The Japanese columns contain a number of articles upon branches of technological chemistry, and some of a more general nature, including one on "Science and its Future," by Mr. S. Oguri. Judging by their titles, the articles cover a wide range of subjects, and indicate that chemists in Japan are quite awake to the importance of their science to the nation's industries. It may be noted, in passing, that the journal contains several American advertisements, but not a solitary British one.

FROM the director of the Wellcome chemical research laboratories we have received copies of sixteen scientific papers published during the last few years by the institution in question. They are chiefly accounts of investigations upon materials likely to be of value in medicine. On one hand, plants used as official or domestic remedies have been examined more thoroughly than hitherto; and, on the other, active constituents of drugs, such as alkaloids, have been investigated with the view of determining their constitution and facilitating the possible synthesis of similar therapeutic agents. The distribution of these memoirs to scientific institutions, formerly made periodically, was suspended during the period of the war, and is now being resumed. The results of the investigations, however, have already appeared in the Transactions of the Chemical Society and the *Pharmaceutical Journal*, so that they need not be mentioned here in detail. It will suffice to say that they form an important contribution to our knowledge of the medicinal plants examined, and are a testimony to the excellence of the work done at the laboratories.

THE importance of having a thoroughly trustworthy instrument for detecting and measuring the amount of any combustible gas present in the air at any time has led the Bureau of Standards at Washington to investigate the working of existing instruments and to design a further instrument depending on a new principle, which appears to have a great future before it. It depends on the combustion which takes place about a platinum wire in the mixture when an electric current is sent through the wire so as to heat it sufficiently. Three methods of measurement are adopted. The wire may form one arm of a resistance bridge and indicate the amount of gas by the rise of temperature, and therefore of resistance of the wire. Or the current in the wire may be increased until the wire just glows, the increase required being less as the amount of combustible gas increases. Or the heat generated by the combustion may be used to heat a bimetallic strip, the bending of which increases as the heat generated, and therefore as the amount of gas present. Full details of the instruments, with drawings, are contained in Scientific Paper No. 334, by Messrs. E. R. Weaver and E. E. Weibel, of the Bureau.

VOL. iii. of the Memoirs of the College of Science, Kyoto Imperial University, contains an account of a series of researches on the electrical resolution of spectral lines (Stark effect). The method employed was that originated by Lo Surdo, in which the intense electric field in the cathode dark space of a vacuum tube is utilised. The elements studied include H, He, Li, Ca, Mg, A, N, and O, and a number of new and interesting results have been obtained. The observations on the helium spectrum are particularly complete, and are summarised diagrammatically in a manner which brings out clearly most of the characteristic features of the effect. Special attention is given to the phenomenon of "isolated components," which only exist in sufficiently strong fields, and seem to be exclusively associated with a diffuse type of series. This latter property, together with other features of their observed behaviour, would suggest that it may be legitimate to regard them as a special class of satellite. Another observation of much interest refers to certain combination series lines which make their appearance only in intense electric fields. The examination of the secondary spectrum of hydrogen yielded fifty-four affected lines; these results, in conjunction with the Zeeman effects already on record, should be of material assistance in elucidating the structure of this spectrum. Among other conclusions of general interest may be mentioned the confirmation of the view, which previously rested on somewhat fragmentary evidence, that arc lines are affected by electric fields to a much greater extent than enhanced lines of the same element.

ALTHOUGH there is a general belief that underfed individuals are more susceptible to infection than well-fed persons, and that when the former contract a disease they show less resistance and are more prone to succumb to it, there is no definite scientific evidence even of a general character to support the theory. The study of the interesting question whether the immunity of an animal to disease is affected by a rigorous and prolonged dietetic deficiency is a natural outcome of the work on accessory food factors which has recently been carried out at the Lister Institute, and the current issue of the *Biochemical Journal* contains a suggestive paper on the subject by Dr. S. S. Zilva. Immunity is a complicated biological phenomenon which does not lend itself to quantitative estimation, but certain phenomena which accompany it, such as phagocytosis, complement fixation, and agglutination, can be estimated quantitatively for comparative purposes. Dr. Zilva has studied the effect on amboceptor and agglutinin formation and the complement content of the blood of rats, of diets deficient in (*a*) the elements calcium, iron, potassium, chlorine, phosphorus, and sodium; (*b*) certain amino-acids; and (*c*) the antiscorbutic, antineuritic, and fat soluble A accessory factors, the rat being the animal employed. The diets investigated were (1) those low in the elements mentioned; (2) those containing 12 per cent. and 8 per cent. of caseinogen as a source of protein; (3) those containing 18 per cent. of gliadin as the sole source of protein; and (4) those deficient in each of the three accessory food factors. As a result of several of the deficiencies the animals exhibited restricted growth and poor condition, but, except when the diet was deficient in phosphorus, no differentiation in the titres of the agglutinins and amboceptor could be recorded. Guinea-pigs, whether fed on an unrestricted mixed diet, quantitatively restricted mixed diet, or a scorbutic diet, showed no difference in the amboceptor and agglutinin titres or in the complement activity of their blood.

THE useful select list of scientific and technical books published in the Descriptive Catalogue of the British Scientific Products Exhibition, 1919, has, with the permission of the British Science Guild, been issued separately in pamphlet form by Messrs. A. and F. Denny, 147 Strand, London, W.C.2. The list gives in sixty pages the bibliographic particulars of standard books in the English language in sixteen branches of applied science, from aeronautics to wireless telegraphy. The date and price of the existing edition are shown in each case, and every volume in the list is on sale, so that any of the books ordered can be obtained without difficulty. Messrs. Denny will be glad to send a copy of the list to anyone who will apply to them for it.

THE following volumes are in active preparation for publication by the Hakluyt Society:—"The Chronicles of Muntaner," translated and edited by Lady Goodenough; "Jons Olafssonar Indiafara," translated by Miss B. Phillpotts, edited by Sir R. C. Temple, Bart., 2 vols.; "William Lockerby's Journal in Fiji, 1808," edited by Sir E. F. im Thurn and L. C. Wharton; "A Description of the Coasts of East Africa and Malabar in the Beginning of the Sixteenth Century," by D. Barbosa, translated by L. Dames, vol. ii.; and "Anales del Peru," by L. F. Montesinos, translated and edited by P. A. Means.

A LENGTHY and interesting catalogue (No. 181) has just been circulated by Messrs. W. Heffer and Sons, Ltd., Cambridge. The books (more than 1600 in number) are of a miscellaneous character, but there are sections devoted to archæology, folk-lore, anthropology, and kindred subjects; Irish literature, folk-lore, and archæology; and science and mathematics. In addition, Messrs. Heffer direct attention to collections of flint and bronze implements and of pottery which they have for disposal.

Messrs. George Bell and Sons, Ltd., have completed arrangements with Prof. Moureu for the publication of a translation of "Notions fondamentales de chimie organique." The translation is being made of the fifth French edition, in which additional space is devoted to a more extensive treatment of stereo-chemistry, and of the relations between chemical constitution and physical properties. There will also be an additional chapter on dyestuffs.

OUR ASTRONOMICAL COLUMN.

COMETS.—Miss Vinter Hansen and Mr. Fischer Petersen have deduced elliptical elements for the comet 1919*b* (Brorsen-Metcalf), and give the following ephemeris:—

For Greenwich Midnight.

	R.A.	N. Decl.	Log r	Log Δ
	h. m. s.	°		
Sept. 19 ...	12 7 43	42 46	9·8967	9·5175
21 ...	12 1 24	38 54		
23 ...	11 56 36	35 30	9·8577	9·5935
25 ...	11 52 52	32 28		
27 ...	11 50 0	29 43	9·8168	9·6647
29 ...	11 47 50	27 11		

Prof. Wolf noted that at the end of August the comet was easily visible to the naked eye as a large, round nebula, with central condensation, and a tail. The theoretical brightness is now diminishing, but there is likely to be an increase in physical brightness as perihelion is approached (about October 17). The comet is in conjunction with the sun on September 22; after that date it may be observed to most advantage in the morning sky.

M. Ebell gives the following continuation of the ephemeris of Kopff's periodic comet 1919*a*:—

For Greenwich Midnight.

	R.A.	S. Decl.
	h. m. s.	° ′
Sept. 18	19 52 18	7 50
20	19 54 40	7 49
22	19 57 6	7 48
24	19 59 37	7 46
Sept. 26	20 2 12	7 45
28	20 4 51	7 43
30	20 7 34	7 41
Oct. 2	20 10 21	7 38

On September 24, log r=0·2755, , log Δ=0·0740, magnitude 11·7.

Continuation of the ephemeris of comet 1919*c*:—

For Greenwich Midnight.

	R.A.	N. Decl.
	h. m. s.	° ′
Sept. 18	14 49 5	16 0
22	14 56 46	14 16
26	15 4 40	12 30
Sept. 30	15 12 47	10 44
Oct. 4	15 21 8	8 57
8	15 29 42	7 10

The comet is brightening slowly, its magnitude on October 8 being 8·5.

THE BLINK MICROSCOPE.—Mr. R. T. A. Innes has an article on this subject in *Scientia* for September. He is one of the chief workers with this instrument, so he speaks with authority. It is unrivalled as the readiest means of picking out all the large proper motions on a pair of plates. Taking the smallest proper motion that can be detected in the case of plates taken twenty-five years apart as $1\frac{1}{4}''$ in this interval, or $5''$ per century, Mr. Innes states that there are about three such stars in each square